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INFOSYSTEMS

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The Readers Speak Out: The State of MIS

The Mainframe's Future Voice and Data Networks

Project Management Software

RECOVERING FROM A DISASTER

Exclusive Interview Adam Osborne

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Ergonomics

Key is to balance computer response time with user performance

In the old days when typewriters from Harrods (in London) cost six and a half pounds, newspapers carried advertisements urging shorthand typists to purchase shoulder braces to cure their work-related ills.

Although technology has certainly progressed, these types of concerns haven't, according to Brian Shackel, founder and director of the Human Sciences & Advance Technology (HUSAT) research group at Loughborough University in England. As efforts are taken to balance computer response time and user performance, this will change, he said.

To this end, input and output devices should be selected that are comfortable for the user and in accordance with other workplace standards, Shackel pointed out at the World Conference on Ergonomics in Computer Systems held in Chicago.

Shackel explained that workplace design is often carried out with a "take it or leave it approach." There are problems with this thinking, he said. He cited discretionary users who can choose whether or not they want to be a part of the technology, and then there are those who have to rely on the technology if they want to keep their jobs. He said it's important to remember that users vary in their attitudes, physical strength, motivation and training.

"If you see DYI (do-it-yourself) ergonomics, you can guess that the design is inadequate," Shackel noted. An example of this would be if an employee taped a handwritten sign on a facsimile machine that said, "Slide your document through quickly."

Usage is dependent on a complex circle of information decision loops, according to Shackel. For instance, human input is basically multichanneled, flexible but slow, and dynamic in range. Computer output, on the other hand, is primarily visual, fast and limited in speech.

For effective design, human characteristics need to be evaluated, Shackel said. Silent reading typically averages 300 words per minute (wpm) whereas spontaneous speaking averages 150 wpm. A person speaking much faster would lose his audience.

In other human communication modes, the average handwriting speed is estimated at between 24 and 30 wpm. Shackel sees this becoming obsolete. Skilled typists average 100 to 150 wpm and can punch a 10-button phone at between 70 and 90 wpm.

Characteristics such as these affect the way a keyboard should be designed, Shackel said. There has been much research on whether letters and numbers should conform to telephone, calculator or typewriter layout or to some other two-row type of format.

Although "qwerty" is the de facto standard, Shackel conceded that it puts a higher load on the left hand. A European-developed keyboard has an estimated five percent improvement rate over "qwerty," he said, but long-term fatigue is not measured.

Shackel recommends devising an international standard that would complement all languages. Research also has probed designing keyboards around the human hand, in a split-level sort of mode.

Other related input devices include the mouse, light pens, touch screens and digital tablets. But Shackel thinks it would be more disruptive for a touch typist to go to a mouse, for example, than to a cursor or text edit keys. Optical character readers (OCR) and voice recognition also are becoming popular.

The most commonly used output devices are printers and CRTs. Alternative technologies are available, however, including synthesized speech, electroluminescence panels and liquid crystal displays.

With printers, ergonomic considerations include size and style of type font, noise and user controls. With CRTs, screen size, distance from user, tilt and swivel capacities, glare reduction, character brightness and user controls should be taken into account.

Shackel added that most people would prefer to read a printout of something they wrote on a terminal. It takes 25 to 30 percent longer to do text editing on screen than on paper, he said, noting that people produce 10 percent more errors with text editing. Shackel would also like a format designed to enable users to see a visual overview of what's in a data base, rather than bits and pieces compressed into one window.

The solution, according to Shackel, is to develop recommendations in all areas. With all the talk about "user-friendly" workstations, he said, there's still a growing number of people who concede, 'Well, I'm not computer-friendly.' "

—WJC

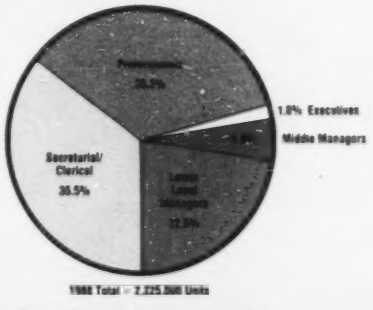
Trends

Clericals, professionals vie for market

Secretarial and clerical workers are expected to continue to use the greatest number of workstations over the next five years, although professional workers will penetrate the workstation market. This is one of the conclusions reached in a study conducted by Advanced Resources Development (ARD), Medfield, MA.

Workstation Shipments by Occupational Category 1988

(Percent of Units)



Source: Advanced Resources Development

Shipments of workstations to the secretarial/clerical sector are predicted to increase from 200,000 in 1983 to 790,000 in 1988. Shipments for use by professional workers also will increase from 114,000 in 1983 to 785,000 in 1988, the study notes.

Although automation has been slower in this sector than other white-collar sectors, the report expects to see significant future growth. This might be affected by the increasing popularity of the personal computer and the focus on managerial sector improvements in productivity, ARD says.

Despite the expected growth, the study points out that the secretarial/clerical market share will dip from 47 percent in 1983 to 36 percent in 1988. The professional workers' market share, on the other hand, will jump from 27 percent in 1983 to 35 percent in 1988.

The managerial sector, consisting of executives, middle managers and lower level managers, will account for 650,000 workstation shipments in 1988, up from 116,000 in 1983.

—KAG